Self-assembled heteropolymetallic complexes as MRI contrast agents.

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Magnetic resonance imaging (MRI) is currently routinely used as a diagnostic tool in various medical procedures. In recent years, efforts have been directed towards the finding of contrast agents with improved characteristics such as increased efficiency and organ specificity[1]. Our approach in achieving such goals explores slowing down the rotational motion of the contrast agent by formation of large molecular weight supramolecular structures. A new promising class of these supramolecular structures are the so-called **metallostars**[2]. These are metal complexes built by self-assembly containing a central d-metal ion and peripheral lanthanide ions. For the synthesis of the complexes, novel ditopic ligands were developed. These ligands contain a DTPA-derivative as a binding unit for the lanthanide ion and a catechol, a 8-hydroxyquinoline or a 1,10-phenantroline derivative as a binding unit for Fe(III), Al(III) and Ga(III) ions.

To increase the optical imaging activity, a highly luminescent bimodal complex was developed. Therefore a complex with a central lanthanide ion and peripheral Ru(II) ions was synthesized from a 1,10-phenantroline derivative (Figure 1). The luminescence studies showed a clear indication for the formation of supramolecular complexes. Further studies towards the relaxivity, biodistribution and physico-chemical properties of the complexes are under way and are carried out in cooperation with the research group of Prof. Robert Muller (Université de Mons-Hainaut).

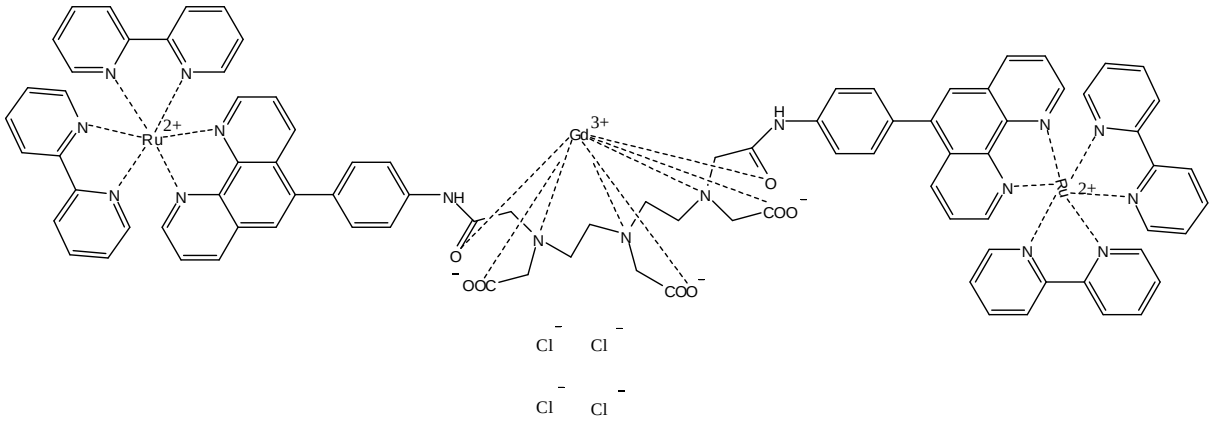

Figure 1: structure of $[[Ru(bipy)_2]_2Gd^{III}BisphenantrolineDTPA]Cl_4$

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[2] J. B. Livramento, A. Sour, A. Borel, A.E. Merbach and E. Toth, Chem. Eur. J. (2006), **12**, 989 – 1003